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13. ABSTRACT (Maximum 200 words) Chlorotrifluoroethylene (CTFE) Oligomer is a nonflammable, saturated, hydrogen-free halocarbon oil with chain lengths of six to ten carbons. CTFE was seen to have a low degree of toxicity in acute toxicity tests. A subchronic study was conducted because CTFE is an excellent candidate hydraulic fluid. The objective of this electron microscopic investigation was to examine and compare the livers of male and female rats after inhalation exposure to CTFE for 90 days.				
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CHLOROTRIFLUOROETHYLENE (CTFE) OLIGOMER: EFFECT ON LIVERS OF FISCHER-344 RATS

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Chlorotrifluoroethylene (CTFE) oligomer is a nonflammable, saturated, hydrogen-free halocarbon oil with chain lengths of six to ten carbons. CTFE was seen to have a low degree of toxicity in acute toxicity tests.<sup>1</sup> A subchronic study was conducted because CTFE is an excellent candidate hydraulic fluid. The objective of this electron microscopic investigation was to examine and compare the livers of male and female rats after inhalation exposure to CTFE for 90 days.

Male and female Fischer-344 rats were exposed to 0.25, 0.5, or 1.0 mg/L CTFE aerosol for 90 days, 6 h/day, 5 days/week. An equal number of control rats were exposed to air only. Following the 90-day exposure period, 10 male and 10 female rats were sacrificed from each group. A 1mm slice of the left lobe of the liver of three rats of each sex and each group was collected for transmission electron microscopic examination. The liver slices were fixed in 2% glutaraldehyde in 0.1M cacodylate buffer at pH 7.4 and minced into 1 cubic mm pieces. The minced tissue was post-fixed with 2% osmium and was processed into Polybed 812 plastic capsules. One micron thick sections were cut in order to identify centrilobular zones. Thin sections were cut from the centrilobular and intermediate zones of liver lobules. Thin sections stained with uranyl acetate and lead citrate, were examined with a JEOL 100B Transmission Electron Microscope at 60 kV.

Repeated exposure to CTFE for 90 days resulted in increased liver weights in both male and female rats. Hepatocytes at the light microscopic level appeared to be hypertrophied due to hyaline eosinophilic inclusions in the cytoplasm. The livers of male rats were more affected than female rats. Transmission electron microscopy revealed the hypertrophy was due to induction of smooth endoplasmic reticulum (SER) and peroxisomal proliferation. In male rats there was disruption of rough endoplasmic reticulum (RER). There was mild to moderate mitochondrial swelling in both male and female rats. The changes seen in livers of rats exposed to CTFE were similar to the changes in livers of rats exposed to perfluoro-n-decanoic acid.<sup>2</sup> Livers of male rats were more sensitive to inhaled CTFE than female rat livers.

References

1. E.R. Kinkead, et al., AAMRL-TR-87-044. (1987)5.
2. Van Rafelghem, et al., *Fund. and Appl. Tox.* (1987)9, 522.
3. Acknowledgment: Corliss A. Goldsmith for assistance in preparing this abstract.

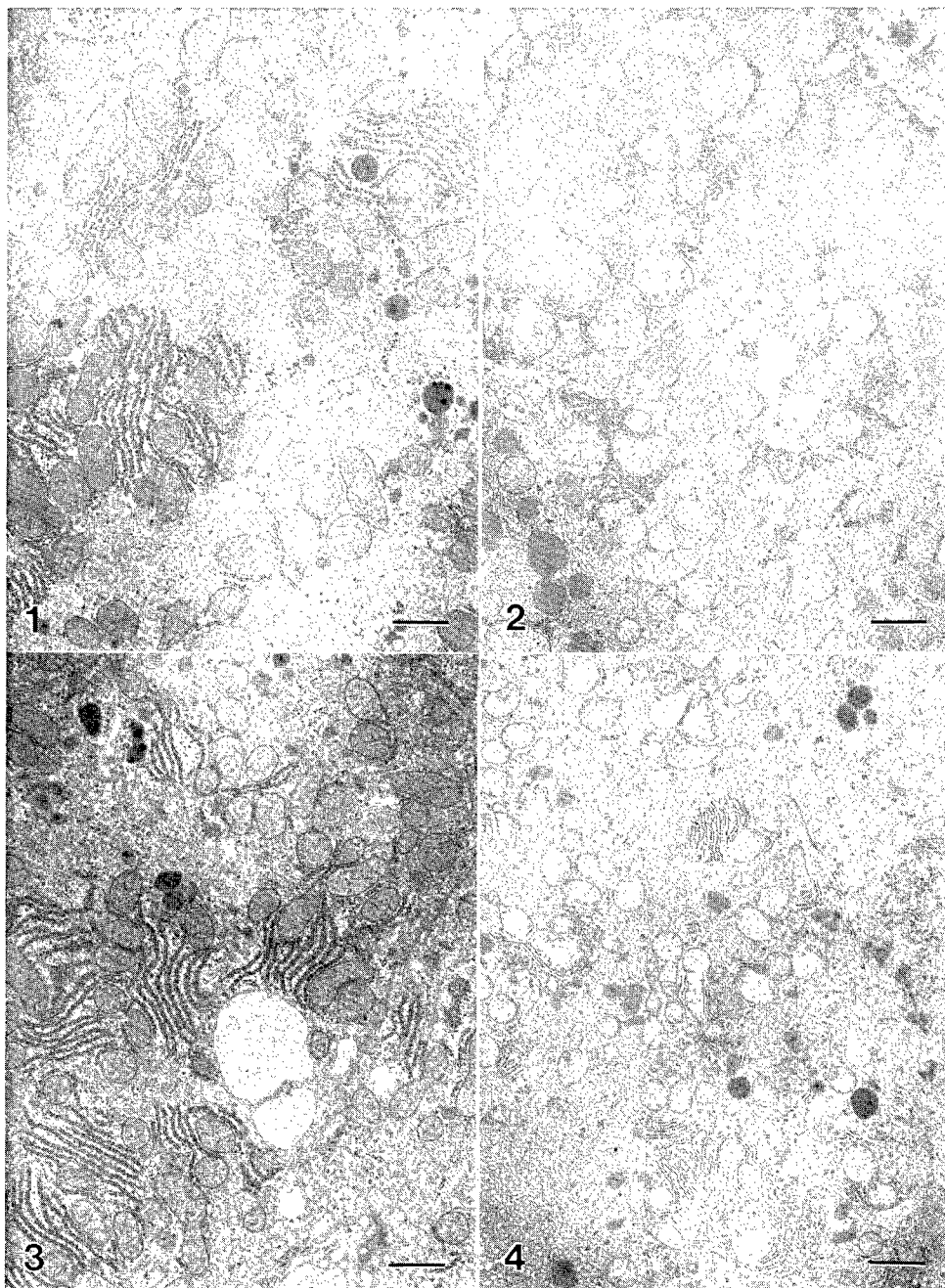


FIG. 1.--Control hepatocyte from liver of male rat. Bar = 1 um.  
 FIG. 2.--SER, peroxisomes, disrupted RER and swollen mitochondria in liver of male rat exposed to 1.0 mg/L CTFE. Bar = 1 um.  
 FIG. 3.--Control hepatocyte from liver of female rat. Bar = 1 um.  
 FIG. 4.--SER, peroxisomes and swollen mitochondria in liver of female rat exposed to 1.0 mg/L CTFE. Bar = 1 um.